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(54) **Water chuck**

(57) A water chuck having rotary and stationary parts (22, 20, 26) with sealing means therebetween, the rotary part comprising an annular rotary member (20 or 26) and said sealing means comprising an O-ring (23) and a stationary P.T.F.E. washer (24) urged into sealing engagement with the annular rotary member by the O-ring.

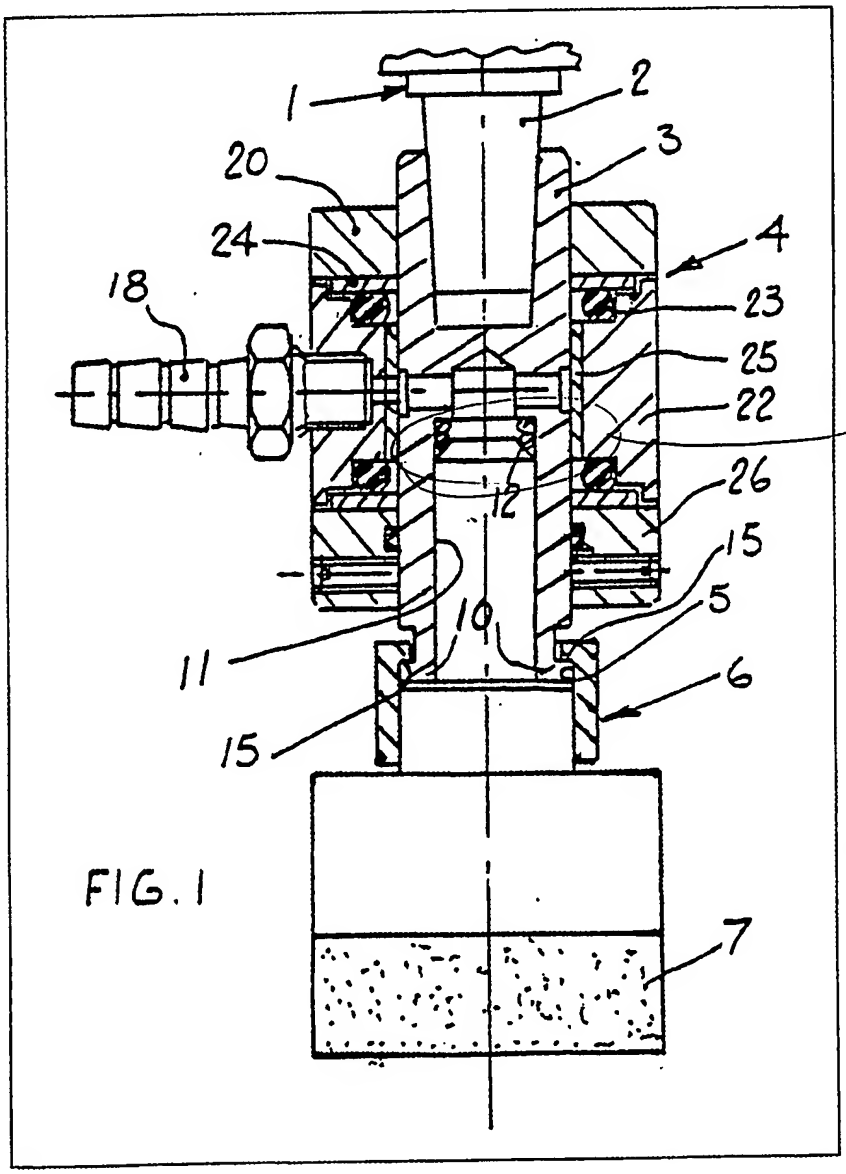

FIG. 1

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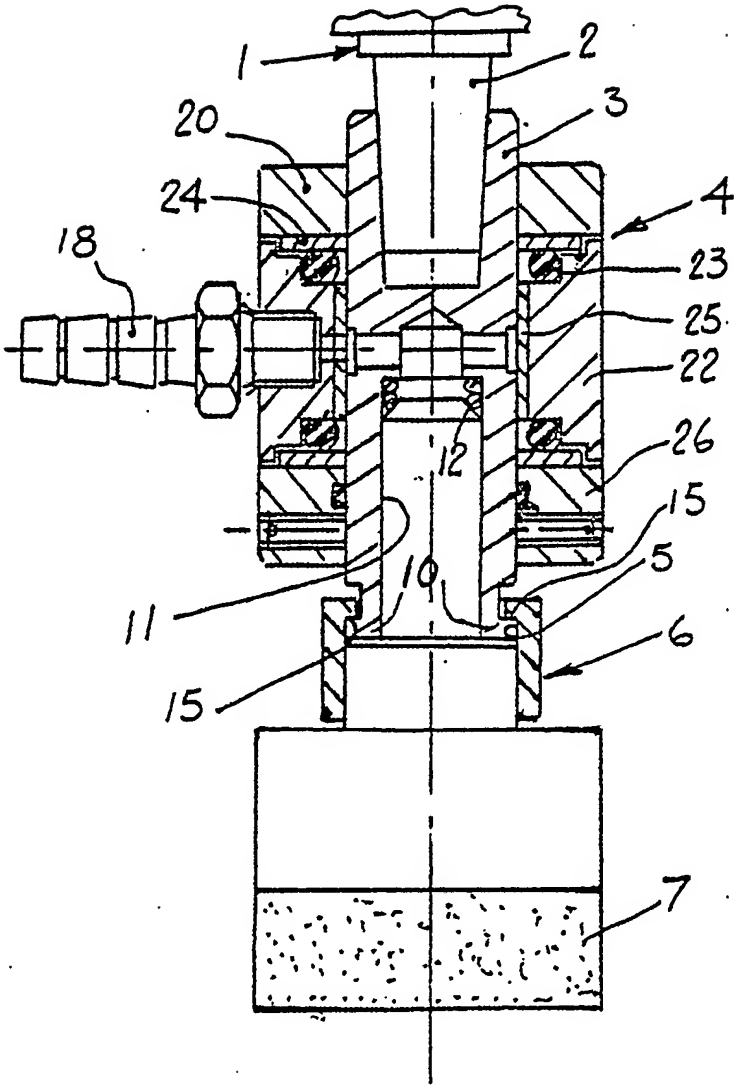

FIG. 1

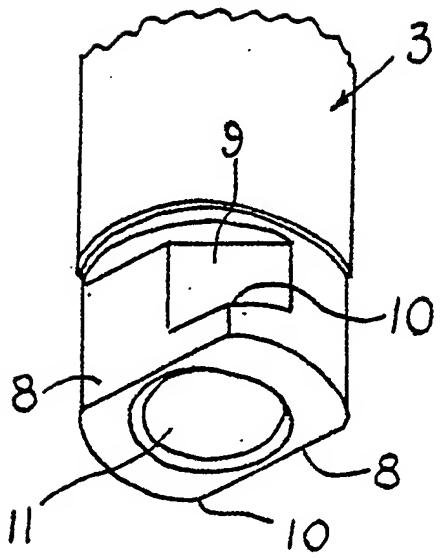

FIG. 2

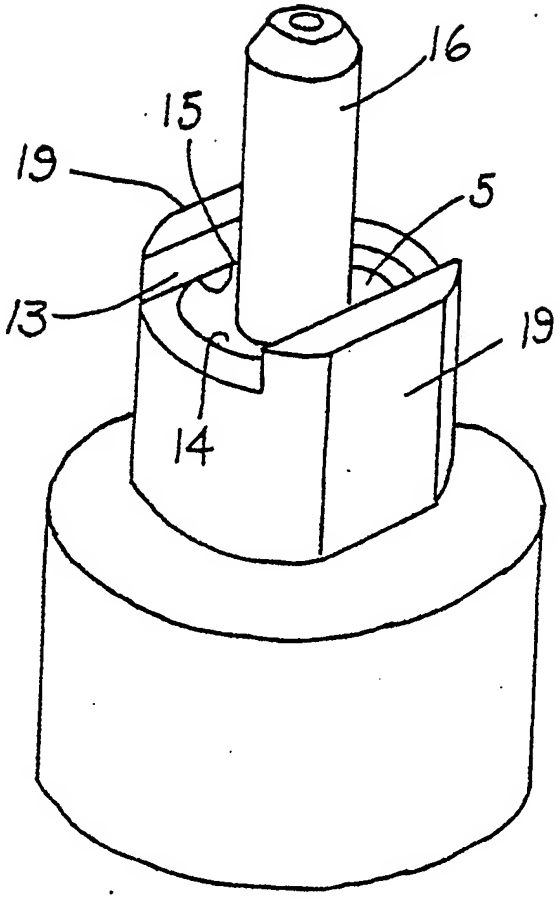

FIG. 3

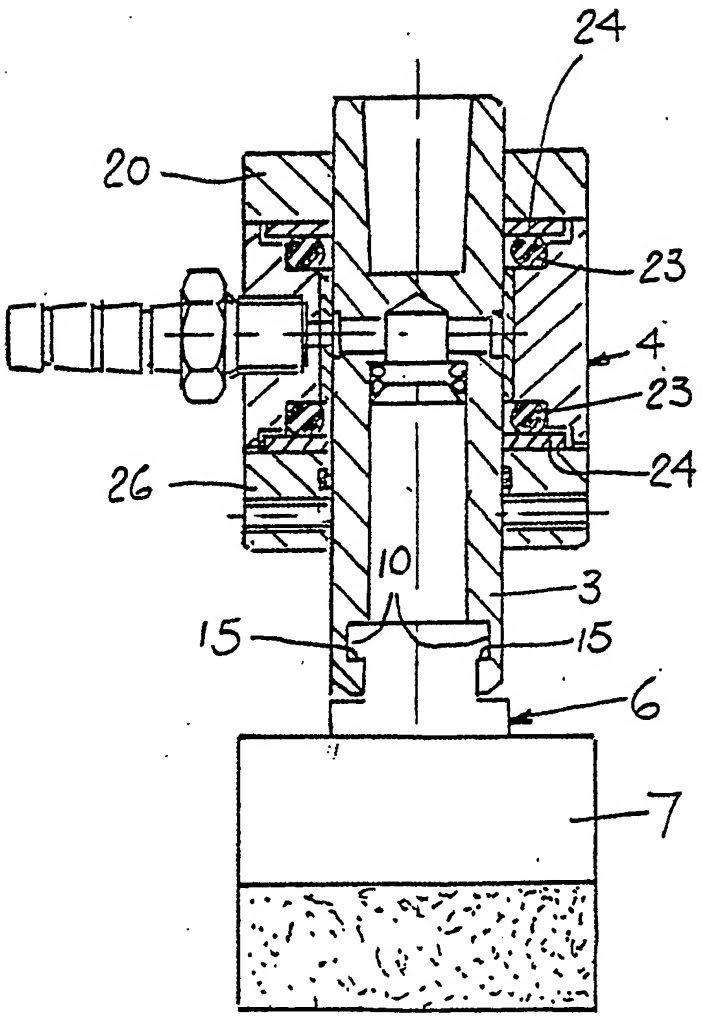

FIG. 4

SPECIFICATION

Water chuck

The invention relates to a water chuck.

According to the invention there is provided a water chuck having rotary and stationary parts with sealing means therebetween, the rotary part comprising an annular rotary member and the sealing means comprising an O-ring and a stationary washer urged into sealing engagement with the annular rotary member by the O-ring.

A chuck in accordance with the invention will now be described by way of example with reference to the accompanying drawings in which:-

Figure 1 is a vertical cross section through a preferred form of water chuck, shown in use with a tubular glass drill.

Figure 2 is a perspective view of the driving member of the chuck shown in Figure 1.

Figure 3 is a perspective view of the driven member of the drill shown in Figure 2, and

Figure 4 is a vertical cross section similar to Figure 1 illustrating an alternative arrangement.

A drill spindle 1 has a taper shank 2 which locates in the upper end (as viewed in Figure 1) of a drive shaft 3 of a water chuck 4 described below. The lower end of the drive shaft 3 (constituting the aforesaid driving member) is formed so as to co-operate with a recess 5 in a driven member 6 which carries a tubular glass drill 7. Referring to Figure 2 the lower end of the shaft 3 is cut away to form two parallel side faces 8. Further parallel cut outs 9 are formed (one only of which is shown in Figure 2) at an angle (e.g. 45°) to the faces 8 so as to leave projecting portions 10. The shaft 3 has an axial through bore 11 which has rubber seals 12 at its upper end (see Figure 1). Referring to Figure 3, the recess in the driven member comprises a parallel-sided slot 13 and an annular groove 14. The major diameter of the groove 14 is greater than the width of the slot so that undercut sections 15 are formed. The width of the slot is very slightly greater than the distance between the side faces 8 on the shaft 3. A hollow spigot 16 extends upwardly from the groove 14. The spigot fits with working clearance in the bore 11.

To interconnect the driving and driven members, the spigot 16 is inserted in the bore 11 and the driven member is rotated to align the slot 13 and side faces 8. Continued axial sliding of the spigot 16 along the bore 11 enables the side faces 8 to slide through the slot 13 and partly into the groove 14 whereupon the upper end of the spigot 16 sealingly engages the rubber seals 12. The driven member is urged upwardly to compress the rubber seals 12 and to align the projections 10 with the entry to the undercut sections 15. The driven member is then twisted relative to the driving member so that the projections 10 enter the undercut sections. The cut-outs 9 limit the amount of twist that can be applied by abutting the sides of slot 13. The rubber seals 12 biasses the projections 10 against the upper surfaces of the undercuts 15 to provide frictional resistance against release. The depth of the undercuts 15 and the thickness of the projections 10 may be selected so as to eliminate substantially relative axial movement of the driving and driven members. When the driven member is to be detached, the assembly procedure is simply reversed.

In use, the shaft 3 rotates within the chuck in a direction which urges the cut outs 9 against the sides of the slot 13. Cooling water passes through the chuck from an inlet 18 and through the holow spigot 16 to the interior of the tool 7. Normally, where the glass sheet is to be drilled, the sheet is drilled from both sides in known manner by coaxial drills.

The coupling described avoids the need to screw the driving and driven members together. As seen in Figure 3, the driven member has flats 19 thereon. The flats provide a grip to assist in twisting the driven member by hand. Hitherto such flats have been necessary for receiving a spanner which is entirely unnecessary with the invention.

If desired, the undercuts 15 may be formed on the drive shaft 3 and the projections 10 formed on the driven member 6 as shown in Figure 4.

The chuck illustrated in Figures 1 and 4 has a particularly useful arrangement of seals. The shaft 3 is locked to an annular rotary member 20 which extends across the stationary body portion 22 of the chuck. The upper end of the body portion 22 (as seen in the drawings) is recessed to house an O-ring 23. The O-ring urges a P.T.F.E. seal 24 against the annular undersurface of member 20. A P.T.F.E. bearing bush 25 is carried by the body potion 22 and locates the shaft 3. The lower end of the body portion 22 is arranged in the same way as the upper end and a lower annular rotary member 26 is secured to the shaft 3. If water from the inlet 18 should leak past any of the seals, it will eventually escape from between the adjacent annular surfaces of the rotary and stationary members. This particular form of sealing is advantageous over prior proposals.

CLAIMS

1. A water chuck having rotary and stationary parts with sealing means therebetween, the rotary part comprising an annular rotary member and the sealing means comprising an O-ring and a stationary washer urged into sealing engagement with the annular rotary member by the O-ring.

2. A water chuck according to claim 1, wherein said sealing washer is a P.T.F.E. washer.

3. A water chuck according to claim 1 or 2, comprising a hollow cylindrical stationary body portion, a shaft rotatably mounted in said body portion, a said annular rotary member on said shaft and rotatable therewith adjacent each end of the body portion, and said sealing means between the body portion and each said annular rotary member.

4. A water chuck according to claim 3, wherein said body portion has a first counterbore in each end thereof for receiving a said sealing washer and a second counterbore in each end thereof for receiving a said O-ring.

5. A water chuck according to claim 3 or 4, wherein bearing means is interposed between the

body portion and the shaft.

6. A water chuck according to claim 3, 4 or 5, wherein said shaft has a blind cylindrical bore extending axially from one end thereof, an annular groove in the outer surface thereof and at least one radial passage communicating said annular groove with said bore and wherein said body portion has an inlet port therein which communicates with said annular groove and is connectable to a source of water under pressure.

7. A water chuck according to claim 6, wherein said one end of said shaft is formed to comprise one component of a bayonet coupling.

8. A water chuck substantially as herein described with reference to Figures 1 to 3 or Figure 4 of the accompanying drawings.

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